REMARKS

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Applicants assert that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

Status of Claims

Claims 1-19, 21-25, 27-51 and 75 are pending in this application and are rejected.

Claim 1 has been amended herein, and new claims 76-77 have been added herein. Applicants respectfully assert that the amendments to the claims and the new claim add no new matter

Claim 16 has been canceled without prejudice or disclaimer. In making this cancellation without prejudice, Applicants reserve all rights in these claims to file divisional and/or continuation patent applications.

CLAIM REJECTIONS

35 U.S.C. § 103 Rejections

In the Office Action, the Examiner rejected claims 1-2, 5-19, 32-35, 41-44, 46-50 and 75 under 35 U.S.C. § 103(a), as being unpatentable over Cross (U.S. Patent No. 4,777,338) in view of Hebbar et al. (U.S. Patent No. 6,385,500). Applicants respectfully traverse this rejection.

Cross discloses a method for perforating plastic film, which method comprises moving a film to be perforated through a waterbath, positioning electrodes adjacent opposite the side of the film in this watherbath, and applying a pulsed electrical potential between the electrodes. The spark discharges are externally controlled by a trigger generator "at an appropriate repetition frequency according to the perforation spacing required" (see Cross, column 5, lines 10-12).

Hebbar discloses an improved servomechanism for regulating the spark gap in micro electrical discharge machining (micro-EDM). utilizing a hybrid two actuator servo system for

positioning the micro-EDM electrode, comprising a short stroke actuator (such as a piezoelectric actuator) for instantaneous response, and a second, slower actuator for positioning the fast actuator and for providing the required long stroke. This allows the slower actuator to "feed" the electrode into the work-piece utilizing its long stroke, and the fast, short stroke actuator to respond quickly to instantaneous variations in the spark gap, such as short circuits.

The Examiner admits that Cross does not disclose an electronic feedback mechanism as required by independent claim 1, but asserts that such electronic feedback mechanism is allegedly disclosed by Hebbar.

Applicant notes that independent claim 1 has been amended herein to incorporate the limitations of claim 16, now canceled, and now recites that "step b) occurs by the placement of electrodes at or near said region by placing one electrode on one side of that substrate and by placing another electrode on another side of said substrate, and by application of said voltage across said electrodes".

Applicant respectfully points out to the Examiner the following:

i) The electronic feedback mechanism of Hebbar does not control the properties of the applied voltage and/or of the electrical current applied in step b),

ii) the alleged feedback mechanism of Hebbar rather controls the position of the single electrode with respect to the substrate and keeps this constant using a servomechanical actuator mechanism,

iii) the setup as now claimed in claim 1 of the present invention using two electrodes is entirely incompatible with the disclosure of Hebbar, and

iv) the method in accordance with claim 1 of the present invention deals with electrically insulating substrates, whereas Hebbar is concerned with a process referred to as electrical discharge machining (EDM) which works only with conductive materials, thus aggravating the incompatibility of the Cross-reference with the Hebbar-reference.

In particular, Applicant doe snot agree that an electronic feedback mechanism which controls the properties of the applied voltage and/or electrical current is disclosed in Hebbar. Hebbar is concerned with a process referred to as electrical discharge machining (EDM) or

spark erosion. Such method relates to the machining of electrically conductive materials, as is also conceded by Hebbar (column 1, lines 11-12 of Hebbar). The EDM process uses the work piece, i.e., the substrate to be machined as one electrode and a further electrode as the tool to apply electric pulses. Because the substrate or work piece acts as electrode, EDM can only work with electrically conducting substrates. The distance between electrode and work piece needs to be kept constant because, during the process material is iteratively removed, the distance between the electrode and the work piece needs to be readjusted in order for it to be kept constant. For this reason, the gap between the electrode and the work piece needs to be adjusted (column 2, lines 37-39). Finally, a hole is produced using EDM through an iterative process of machining, during which process, the distance between the electrode and the substrate is readjusted constantly to be kept constant. The feedback mechanism described in column 9, lines 41ff. measures the gap voltage as an indication and sensor for the gap distance. The result of such measurement of gap voltage is used to control an actuator which, in turn, positions and readjusts the electrode with respect to the substrate.

In other words, the electronic feedback mechanism of Hebbar does not control the properties of the voltage and/or electrical current applied in step b). All that the feedback mechanism of Hebbar does is to control the position of the single electrode. The hole that is produced in Hebbar is produced in a series of steps of readjustment of the electrode, in the course of which, the electrode may even have to be introduced into the substrate (see Figure 1 of Hebbar).

In contrast thereto, the process in accordance with the present invention produces a hole within a single spark discharge step, and the distance of the electrodes with respect to the substrate is not relevant. It is not necessary to readjust the position of the electrodes, and the feedback mechanism controls and ends the entire process of hole generation. Consequently, if one of ordinary skill in the art did consider to combine the disclosure of cross with Hebbar, he would not arrive at the subject matter of independent claim 1, since the feedback mechanism of Hebbar serves to adjust the position of a single electrode with respect to the substrate. Hebbar explicitly states that (see column 6, line 9-11 of Hebbar) it relates "to an improved servomechanism for regulating the spark gap in micro electrical discharge machining (micro-EDM)". It does not serve to control the performance of step b).

However, Applicants assert that one of ordinary skill in the art would not combine Cross with Hebbar, because the setup of two electrodes with an electrically insulating substrate in between, as for example disclosed by Cross, is entirely incompatible with the process of electrical discharge machining (EDM), because electrical discharge machining only works with electrically conducting substrates, it uses one electrode as the working electrode and the substrate itself as the counter electrode, and it requires a continuous process control throughout the entire process which is aimed at iteratively removing material from the work piece or substrate. Consequently, one of ordinary skill in the art would not consider to combine the disclosure of Cross with the disclosure Hebbar, because they are going in diametrically opposite directions with respect to the setup, the types of substrates to be used and the manner in which the entire process is controlled. For this reason, the subject matter of amended independent claim 1, which requires that step b) occurs using a two-electrode-setup, is not obvious over a combination of Cross and Hebbar.

Accordingly, Cross and Hebbar in combination do not disclose the method of forming a hole or cavity or channel in a region of electrically insulating substarte, as required by amended independent claim 1.

Consequently, claims 2, 5-19, 32-35, 41-44, 46-50, which are dependent, directly or indirectly, upon amended independent claim 1 and require all the limitations thereof, are not obvious over the combination of Cross and Hebbar. Applicant respectfully requests reconsideration and withdrawal of this rejection.

The Examiner also rejected claims 3-4, 21-25, 27-30, 36-40 and 51 under 35 U.S.C. § 103(a) as being unpatentable over Cross as modified by Hebbar in view of Davies et al. (U.S. Patent No. 3,760,153). Applicants respectfully traverse this rejection.

The combination of Cross as modified by Hebbar in view of Davies et al. does not teach or suggest all the limitations of amended independent claim 1, nor does it teach or suggest all the limitations of dependent claims 3-4, 21-25, 27-30, 36-40 and 51. Cross and Hebbar were discussed above, and that discussion is applicable here. Davies et al. cannot cure the deficiencies of Cross and Hebbar with respect to an electronic feedback mechanism which controls the properties of the applied voltage and/or electrical current. Because the

combinationm of Cross, Hebbar and Davis et al. Do not teach or suggest all the limitations of amended independent claim 1, all the limitations of dependent claims 3-4, 21-25, 27-30, 36-40 and 51, which are all dependent, directly or indirectly, upon amended independent claim 1 and require all the limitations thereof, are also not taught or suggested. Accordingly, claims 3-4, 21-25, 27-30, 36-40 and 51 cannot be obvious over the combinationm of Cross, Hebbar and Davis et al., and Applicants respectfully assert that this rejection should be withdrawn.

In addition, Applicants note that new claims 76 and 77 have been added. These claims are essentially reintroductions of previously canceled claims 20 and 26. With respect to previously cancelled claim 20, now claim 76, the Examiner seemed to have equated substrate brakeage, i.e. the actual breaking of a substrate, with "dialectric breakdown" which are, of course, two different things altogether. As clearly outlined in the original description, page 11, last paragraph, dialectric breakdown refers to a current flow through an electrically insulating material, and is not to be equated with substrate breakage. Apoplicant asserts that, at least because of the dependency of these claims upon amended independent claim 1, these claims are allowable

Conclusion

In view of the foregoing amendments and remarks, Applicants assert that the pending claims are allowable. Their favorable reconsideration and allowance is respectfully requested.

Should the Examiner have any question or comment as to the form, content or entry of this Amendment, the Examiner is requested to contact the undersigned at the telephone number below. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Please charge any fees associated with this paper to deposit account No. 50-3355.

Respectfully submitted,

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